for a source of energy and nutrition. The results of this investigation on *Spirophyllum ferrugineum* would make it appear that for certain of the iron bacteria the storage of iron is not brought about by mechanical means, as MOLISCH suggests.

Using PFEFFER'S phrase "chemosynthesis," LIESKE draws attention to the fact that CO_2 is chemosynthetically assimilated by certain other species of oxidizing bacteria, such as WINOGRADSKY'S nitrate and nitrite bacteria: those capable of transforming thiosulphates into tetrathionic and sulphuric acids; those splitting up H_2O_2; or those that are able to oxidize CH_4 and CO and utilizing the carbon contained therein directly. He then is of the opinion that this particular iron bacterium, *Spirophyllum ferrugineum*, acts in an entirely similar way, inasmuch as from an elementary analysis of organisms grown in a fluid medium containing inorganic salts, metallic iron, and no other source of C other than that supplied indirectly by the action of CO_2 on the metallic iron (forming ferrous carbonate), he was able to prove a distinct increase in the C content of the mass of bacterial filaments. LIESKE calculates that the quantity of ferric oxide that *Spirophyllum ferrugineum* must form from ferrous carbonate to gain one part of C is 750 parts, if roughly estimated in parallel to the requirements of the nitrite bacteria.

That this use of ferrous carbonate for the sole purpose of chemosynthesis of C applies to *all* iron bacteria is, as LIESKE states, questionable; but the fact that it now seems proved in the case of this particular iron bacterium lends new life to the hypothesis of WINOGRADSKY; and at the same time makes it necessary that new and more widespread study of the several species of iron bacteria be undertaken in a most thorough manner.—NORMAN MACL. HARRIS.

Forests of the Philippines.—A rather complete discussion of the economic aspect of the forests of the Philippines, based upon the investigations of WHITFORD, has been issued as a bulletin of the Bureau of Forestry of these Islands.[13] The first part deals with the classification of the various forest types, the importance of the diptocarp types being emphasized, the amount and quality of the lumber, the uses to which it is adapted, the character of the lumbering operations, and the forest products other than lumber. It includes the results of mechanical tests of 34 Philippine woods and a bibliography of both Spanish and English publications on the forestry of the islands. The second part is devoted to the description and illustration of over 100 of the principal tree species. The descriptions relate principally to the trunk, branch, leaf, and wood characters, and not to those of the reproductive parts.

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[13] WHITFORD, H. N., The forests of the Philippines. P.I. Department of the Interior, Bureau of Forestry. Bull. no. 10. Part I, Forest types and products. pp. 94. *pls. 27.* Part II, The principal forest trees. pp. 113. *pls. 103.* Manila: Bureau of Printing. 1911.

The plates include photographic studies of the trunks and drawings of the leaves and fruit.

The forests dominated by members of the Dipterocarpaceae are by far the most important both in extent and in volume of merchantable timber. The composition of these forests is a simple one from the forester's or lumberman's standpoint, a given area seldom having more than 15 or 20 species of economic importance; and in the most productive of the dipterocarp forests, known as the lauan type, 95 per cent of the timber belongs to 6 dominant species. The same forest is complex from the standpoint of the botanist, since it contains 150–200 tree species, the greater number being too small to be economically important. Once within the tangled mass of lianas about the openings, these forests are easy to penetrate.

In addition to an abundance of timber for general construction purposes, these forests produce excellent substitutes for mahogany and lignum vitae, many valuable furniture woods, and woods suitable for carving, engraving, and numerous other purposes. Among the other forest products are resins, oils, rubber, rattan, and bamboo. Lumbering methods have been largely primitive, but these are being replaced by more scientific ones, which promise to produce not only all the timber required for use upon the islands, but considerable quantities for export.—GEO. D. FULLER.

African sand dunes.—The vegetation of a narrow border of sand dunes along the shores of the Bay of Algiers has been described by DUCELLIER.[14] An annual rainfall of over 60 cm., well distributed throughout the year, with a maximum in November and December, and a minimum in July and August, together with a mean temperature ranging from 5° C. in January to 30° C. in August, produces an evergreen vegetation with hardly a cessation of flowers throughout the year. Three distinct bands of vegetation correspond to three distinct topographic zones running parallel with the shore. First is the foredune, with a vegetation characterized by the abundance of annuals and grasses of the usual type, belonging to such well known genera as *Salsola*, *Cakile*, *Silene*, *Euphorbia*, and *Ammophila*. Within this comes a depression termed "bande humide," apparently the same as the "pannes" of European ecologists. Here the vegetation is a mixture of xerophytes, mesophytes, and such hydrophytic forms as species of *Juncus*, *Scirpus*, *Orchis*, *Typha*, and *Nerium*.

In the inland portion of the area there appear to be few dunes of any considerable size. The plants conspicuous in the fixation of the dunes are *Lotus creticus*, *Scabiosa rutaefolia*, and *Pistacia Lentiscus*, while the established dunes are occupied by *Olea europea*, *Pinus halepensis*, *Phillyrea media*, and a considerable number of shrubs and herbs mostly of decidedly xerophytic structure. Among the prominent families represented in the lists of species are the legumes

[14] DUCELLIER L., Étude phytogéographique des dunes de la Baie d'Alger. Rev. Gén. Bot. **23**:273–308; 321–339. 1911.